SPAWAR

Enabling Knowledge Superiority for the Warfighter

Annual Report 2001

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Welcome to the Space & Naval Warfare Systems Command's 2001 Annual Report. Our Team is very excited about having the chance to "fill you in" on all that has been happening recently in this dynamic organization.

This is our first Annual Report in several years. Since our last report the command has relocated from Washington, DC to San Diego, CA and grown, both in size and in budget. We've made several changes in the way we conduct business—with many more on the horizon. These are not changes for change sake, but significant improvements in the way we develop, install, maintain and support our products and train the people who use them. We're also pleased to report that the Fleet, our principal customer, has recognized that change is the byword at SPAWAR. They seem pleased with the changes and with the increased level of support now being provided.

Here are a few examples: We've revised our shipboard installation schedules to be in consonance with CNO ship availabilities; the result is a less intrusive, more cost effective installation of capability. We ensure that deploying Battlegroups and Amphibious Ready Groups have first priority to receive new C4ISR capability. We're talking, and listening, to our fleet customer as never before. We're using our Naval Reserve units to actively support deploying battlegroups, providing much needed training and orientation on SPAWAR installed systems. We've begun an active, command-wide strategic planning effort to ensure all parts of the organization understand our mission, responsibilities and priorities.

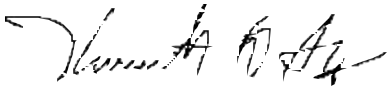
Since the tragic events of 11 September, we've redoubled our efforts, with increased focus on Casualty Reports and Casualty Corrections, timely installation of systems, Command Center reconstruction, Homeland Security issues and other national priorities. We will continue to press in these and other vital areas for the foreseeable future.

Does this mean we've solved all the problems associated with providing the Fleet integrated information technology capability in the twenty-first century? Regrettably, the answer is: "Not just yet." We are still very much aware that more work remains to be done. But "status quo" is gone and new improvements are happening every day. The trend lines are moving in the right direction and more and more customer feedback is positive.

As noted above, this Annual Report is our first in several years. We have worked hard to align ourselves and our priorities with the CNO's priorities and you will see this throughout the document. We feel the areas in which we make the greatest contributions are in the "current and future readiness" priorities, but you will also note some very favorable trends in quality of service, cost reduction, speed to capability and other process improvements.

When you have had the opportunity to read this report, please don't hesitate to let us know your thoughts. Listening is also one of the more important things we do.

One thing you can count on, however, is that our bottom line hasn't changed: We still strive to provide the Fleet with the best C4ISR capability available today. We do it in a timely manner and at the best possible cost. Anything less is unacceptable—to the Fleet and to us.



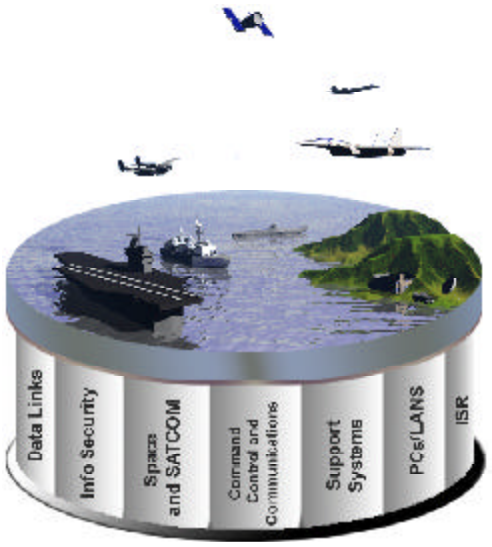
Ken Slaght
Rear Admiral, U.S. Navy
Commander, Space and Naval Warfare
Systems Command

Providing Knowledge Superiority to the Warfighter

Modern warfare is conducted at longer ranges and with greater precision than ever before. Overall mission effectiveness, therefore increasingly depends on systems and services external to the weapons system. At the heart of the U.S. warfighting doctrine are the systems of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR). The purpose of C4ISR, and the mission of the Space and Naval Warfare Systems Command (SPAWAR), is to provide the battle force commander with *knowledge superiority*—the means to see the battlefield, understand its related ongoing activities, formulate effective courses of action, and transmit orders for action.

SPAWAR is the Navy's agent responsible for developing, acquiring and fielding C4ISR systems. Serving Naval Sea Systems Command (NAVSEA) and Naval Air Systems Command (NAVAIR), SPAWAR provides a complete end-to-end capability, from shipboard systems and satellite communications (SATCOM) links to the shore-based infrastructure that supports the Fleet. SPAWAR also provides robust space capabilities to the Fleet and to the Nation, providing SATCOM capabilities and partnering with the National Reconnaissance Office.

SPAWAR is funded by over $4.7B in fiscal resources from Congressional appropriations and various agencies. By aligning ourselves with our customers, SPAWAR is able to provide increased capability at an affordable price. Challenges remain in the financial arena, however, including the clear identification and reduction of our overhead/ indirect costs. Over the last year, we have taken a closer look at the cost of our products and at how we can maximize the capability we provide to the Fleet. Through efforts such as streamlining our installation process, establishing a Business Resource Management Cell, and automating and standardizing our financial systems, we will strive to reduce our total operating costs while continuing to provide ever increasing, vital capability to the Fleet.



Knowledge Superiority

"More than moving information, the real key to Knowledge Superiority is providing the right tools to warfighters—tools that will allow the warfighter to ***translate*** *the information,* ***analyze*** *it, then* ***synthesize*** *that information into decisive,* ***actionable knowledge****, and all in near real-time fashion."*

– RADM Ken Slaght, Commander, Space and Naval Warfare Systems Command

Capability in Action

Conducting any warfighting operation requires *collecting* the right intelligence, surveillance and reconnaissance (ISR) data, then securely *transporting* and *distributing* that data in near real-time to the warfighter for *analysis* and *synthesis* to execute specific missions. As **highlighted** in the following strike scenario, the capabilities and systems of SPAWAR are a critical part of this process—their purpose is to integrate the elements of knowledge superiority to provide the most effective warfighting capability available today.

Onboard *USS John C. Stennis (CVN-74)*, Arabian Gulf, 2003

Current Situation Report: *Rebel forces have overrun the government positions of Redland and appear to be moving to a position less than five miles from the border with Blueland. Following the successful capture of government SCUD missile sites, rebel forces commenced two separate missile strikes across the border, striking both the Comfortzone refugee camp as well as the capital city of Bakar. The 150-man security detachment from the First Marine Division is providing temporary protection for more than 10,000 refugees and over 50 non-government organization personnel.*

Mission for *Stennis* Carrier Battlegroup (CVBG): Conduct precision strike missions against rebel positions in Redland.

Phase I: Using ISR assets, obtain intelligence to assess the full composition and movements of the rebel force in Redland, then share that information with operational forces afloat and ashore.

Mission Planning: As hostilities ashore become more pronounced, the *Stennis* CVBG Commander reviews his overall readiness posture using SPAWAR's **Global Combat Support System (GCSS), Navy Tactical Command Support System** (**NTCSS)**, and the **Joint Status of Readiness and Training System (JSORTS)**, to verify organic logistical and weapons status.

ISR Collection: Information on Redland land and sea forces is collected from a variety of National and Navy assets. Some of the SPAWAR systems used for collecting intelligence information are the **Naval Space Surveillance System (NSSS), or "Space Fence,"** the **Integrated Undersea Surveillance System (IUSS)**, and tactical cryptologic systems organic to the battlegroup, such as **Ship's Signals Exploitation Equipment (SSEE)** and **Combat Direction Finding (CDF).**

Information Transfer: Sensor and intelligence information is encrypted, switched, routed, and transmitted through antennas and satellites to the strike planners from the battlegroup and to Marine Corps security forces and Special Operations Forces on the ground. Using SPAWAR's **Ultra High Frequency Follow On (UFO) satellite constellation** and several satellite communications media, including **Commercial Wideband Satellite Communications Program (CWSP)**, **Super High Frequency** (**SHF)** and **Extremely High Frequency (EHF)** paths, and the **Global Broadcast Service (GBS)**, the right information, both for targeting and for potentially executing a noncombatant evacuation operation is rapidly available to the battlegroup's mission planners.

Information Distribution: Using **Tactical Data Link Systems**, **Battle Force Email**, **video teleconferencing**, and other collaborative tools, mission planners from *Stennis* Carrier Battle Group, *Bon Homme Richard Amphibious Readiness Group*, and the *13th Marine Expeditionary Unit* (MEU) can maintain a **Common Operational Picture (COP)** to seamlessly coordinate their respective missions.

Information Synthesis and Display: As ISR information is consolidated and integrated, battlegroup commanders and mission planners review Redland's order of battle information using SPAWAR's **Modernized Integrated Database (MIDB)**. Command and control information from Air Force Joint Surveillance Target Attach Radar System (JSTARS) aircraft is received through the **Naval JSTARS Interface** and Unmanned Aerial Vehicles (UAV) via close-in submarine support is integrated and displayed via the **Global Command and Control System-Maritime (GCCS-M)**.

Phase 2: Conduct joint air and missile strikes on Redland's SCUD sites and rebel positions.

Engagement Planning: Weather forecasts and cloud cover imagery provided by regional Meteorological/Oceanographic (METOC) centers are overlaid on COP to determine sensor coverage and weather window for the strike mission.

With an interface from the **Theater Battle Management Core Systems (TBMCS)**, the battlegroup receives the joint Air Tasking Order —which is also displayed on **GCCS-M**—identifying specific targets inside Redland, the weapons to employ, and the means for deconflicting with other joint and coalition members. Concurrently, the battlegroup receives the latest Mission Data Updates via the **GBS** for specific Redland targets, which are then loaded into the Tomahawk Weapon System for employment of the Tomahawk Land Attack Missile. The **Joint Tactical Information Distribution System (JTIDS)** and **Global Positioning System (GPS)** files from **GCCS-M** are loaded into an F/A-18 squadron's Tactical Automated Mission Planning System (TAMPS), thereby maximizing the use of its onboard weapons systems. Finally, using several **Information Operations** tools, allied forces can isolate and confuse Redland's forces.

Phase 3: Conduct Battle Damage Assessment.

Following a successful series of air strikes on rebel positions in Redland, organic signals intelligence equipment installed on its afloat platforms. Systems such as the **Battle Group Passive Horizon Extension System** and the **Common Data Link - Navy** collect and distribute battle damage assessments of Redland targets to mission planners afloat for successive strike options and priorities.

Command and Control Systems

At the heart of the previous maritime strike scenario—and indeed at the heart of executing any operational tasking—is the ability of maritime commanders to possess *decision superiority*. A vital component of decision superiority is command and control systems that give operational commanders a common view of the entire battlespace, fusing together ISR information to provide the commander with a common operational picture.

Command and Control Afloat

SPAWAR continues to drive the future of maritime command and control, particularly through the fielding and upgrading of the GCCS-M, the maritime component of the command and control system used by Theater Commanders-in-Chief (CINCs) and National Command Authorities. The GCCS-M is the basis of command and control for maritime forces both afloat and ashore.

SPAWAR improved maritime command and control capabilities through the successful operational evaluation and Fleet release of GCCS-M version 3.1.2.1. This version provides an initial capability that allows participation by naval units in the Joint Common Operational Picture (COP).

GCCS-M version 3.1.2.1 improves "speed of command", allowing commanders to measure data latency in seconds instead of minutes. Using COP Synch Tools (CST), version 3.1.2.1 distributes command and control data through a Wide Area Network (WAN), automating the process of transferring and synchronizing data across the battlespace. Automation in turn minimizes the need for operator intervention, allowing near real-time exchange of track data between nodes. Each node can then receive both raw and processed track information, then distribute the results of track correlation and fusion through the CST network.

CST has also become the building block for further development of the Time Critical Targeting/Time Critical Strike prototypes within SPAWAR, with GCCS-M 3.1.2.1 enhancing current command and control capability and serving as the cornerstone for future development.

Decision Superiority

"*Better decisions arrived at and implemented faster than an opponent can react or, in a noncombat situation, at a tempo that allows the force to shape the situation or react to changes to accomplish its mission*."

– Joint Vision 2020

Command and Control Ashore

In support of SPAWAR's ashore command and control systems, we continue to refine and aggressively organize our Command Center product line. The effort is focused on horizontal integration, interoperability, configuration management, and quality installations. In FY 01, the SPAWAR Team developed and refined a scalable, 30-month C4ISR Initial Operating Capability process that provides early identification and integration of design requirements, embedded horizontal integration in design, and tailored transition planning. Current projects include Command Centers for U.S. Commander-in-Chief, Pacific and the Navy Command Center for U.S. Central Command.

C4ISR Installations During FY01:

Afloat – Over 450 systems including:

- Battle Force E-mail (BF E-mail)
- International Maritime Satellite (INMARSAT)
- Naval Tactical Command Support System (NTCSS)
- Theater Battle Management Core System (TBMCS)
- Submarine High Data Rate (SubHDR)
- TV-Direct to Sailor (TV-DTS)
- Global Command and Control System-Maritime (GCCS-M)
- Tactical Information Dissemination System (TIDS)
- Integrated Shipboard Network System (ISNS)
- Automated Digital Network System (ADNS)

Ashore – Over 350 systems including:

- Defense Messaging System (DMS)
- Tactical Data Information Link (TADIL)
- Global Broadcast System(GBS)
- Global Command and Control System-Maritime (GCCS-M)
- Naval Tactical Command Support System (NTCSS)
- Naval Integrated Tactical Environmental System (NITES)

Tactical Data Links and Joint/Coalition Interoperability

As with our command and control systems, SPAWAR continues to improve tactical interoperability and seamless data sharing among ships, battlegroups, and joint and coalition forces, resulting in increased situational awareness and a greater degree of knowledge superiority.

Tactical Data Links

In FY 01, SPAWAR continued to aggressively coordinate with other system commands (SYSCOMs) and joint agencies to increase tactical interoperability—the seamless exchange of information among theater assets to provide a common operational picture. Our next generation data link is the Multifunctional Information Distribution System (MIDS). This follow-on to the Link-16 system (also called Joint Tactical Information Distribution System or JTIDS) delivered the first production units to the Navy for verification and testing in late 2001. MIDS equipment will be part of more than 17 international programs, including installations on ships, missile batteries, and fighter aircraft (including the F/A-18 and F-16 multi-role fighters).

Two noteworthy accomplishments in FY 01 were improvements in Multi Tactical Data Links Capability (MTC) and enhancements in existing Link-11 surveillance network architectures. MTC ties the GCCS-M and its information systems into the real-time surveillance networks Link-11 and Link-16. Through invaluable enhancements that only real-time sensor information can bring to the operational commanders' situational awareness, this capability has revolutionized the commander's ability to view the battlespace from a planning and intelligence perspective. All of our command ships have been outfitted with the MTC system, and two carriers are undergoing installation work.

SPAWAR has enhanced its legacy Link-11 architectures, by converting and field testing a new radio modulation scheme to enhance connectivity (a longstanding deficiency of the link due to radio propagation effects). We also fielded multi-channel, multi-frequency equipment to add flexibility and redundancy to the radio channels and improved operator interface software which allows a more informed assessment of the network's performance. These enhancements have resulted in substantial improvements to the Fleet's tactical flexibility and effectiveness by reducing network losses and outages.

Theater Battle Management Core System (TBMCS)

TBMCS is an Air Force software program used by all services to plan and disseminate joint Air Tasking Orders. SPAWAR began fielding TBMCS in early FY 01 and the system is used daily in support of Operation Enduring Freedom. SPAWAR also continues to work closely with the Air Force's Electronic Systems Command to fully integrate TBMCS into the GCCS-M. This integration effort has significantly enhanced joint interoperability, allowing the dissemination of critical targeting information in a more timely manner and eliminating several redundant servers. In FY 01, SPAWAR provided new hardware upgrades for TBMCS installations on 12 ships—carriers, large deck amphibious ships, and command ships. So far, 17 ships have received TBMCS version 1.0.1 software.

Joint Surveillance Target Attack Radar System (JSTARS)

JSTARS is a joint Army-Air Force program designed to provide near real time, wide area surveillance and targeting information on moving and stationary ground targets, slow moving rotary and fixed-winged aircraft, rotating antennas, and theater missile defense targets of interest. SPAWAR has worked closely with the Army and Air Force to produce the Naval JSTARS Interface (NJI). NJI provides the ability to display, replay, and track Ground Moving Target Indicator (GMTI) data in the Common Operating Picture. GMTI is a necessary component of tactical command support and can be used for situational awareness, sensor cueing and rapid target update throughout the strike process. Over the last year, Fleet Battle Experiments have successfully demonstrated NJI capabilities.

Space and Satellite Capability

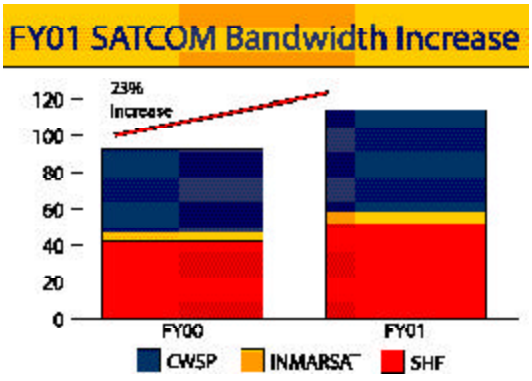
In FY 01, SPAWAR provided the Fleet with a significant increase in voice and data communications capabilities, substantially improving overall performance. These enhancements were accomplished through steady increases and upgrades to our constellation system as well as to the Fleet's satellite communications infrastructure. SPAWAR's efforts in this area have resulted in greater bandwidth (increased data flow to the user), translating into faster and increased *decision superiority* for the warfighter.

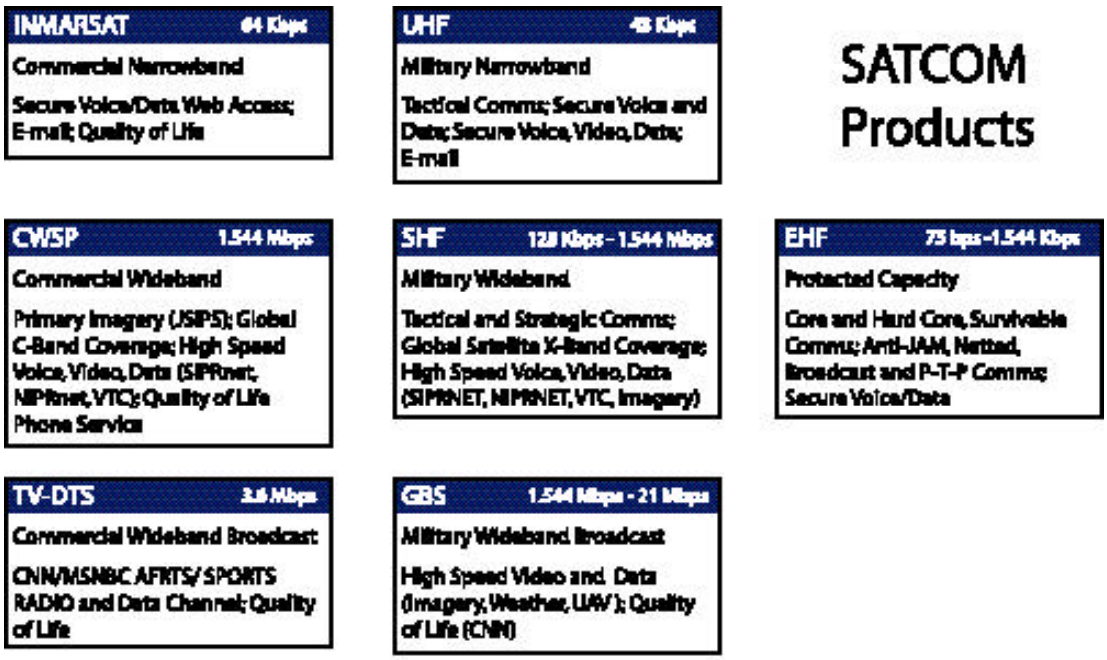
Satellite Launches

In February 2000, SPAWAR brought the UFO satellite constellation to Full Operational Capability, completing the narrowband communications satellite system that is used by all the military services and several U.S. government agencies. An eleventh UFO satellite has a planned launch date of December 2003. This will maintain the availability of the UFO constellation until the next generation narrowband SATCOM system, the Mobile User Objective System (MUOS), is developed and placed in orbit in the 2007 timeframe. MUOS will provide enhanced narrowband SATCOM capacity and improved capabilities, including communications for mobile forces in stressed environments such as dense foliage and urban areas.

Bandwidth Increases

Terminal bandwidth provided by SPAWAR in FY 01 increased from 93.5 Mbps to 115.4 Mbps, a 23 percent increase in the bandwidth available to the Fleet. In addition, an increase of 174 terminals afloat resulted in a 27 percent increase in the number of afloat terminals. Overall bandwidth increases occurred primarily in the SHF, International Maritime Satellite (INMARSAT) program, and Commercial Wideband Satellite Program (CWSP). The number of INMARSAT channels leased for the Fleet, for example, increased from 75 to 100, which increased the bandwidth available to unit-level ships from 5.2 to 6.4 Mbps.





The bandwidth increase for the submarine force was the most pronounced this year with the Fleet introduction of the Submarine High Data Rate (SubHDR) system which enables the submarine force to improve their participation in Network Centric Warfare (NCW). SubHDR provides a quantum leap in communication capability for the submarine force:

- 2.4Kbps EHF LDR
- 64Kbps/128Kbps SHF/DSCS transmit/ receive capability
- 23Mbps GBS and 256Kbps EHF MDR capability using satellite spot beams.

SubHDR coupled with the ADNS, GCCS-M and TIDS systems, is the backbone of the wideband end-to-end capability.

The increase in bandwidth and satellite communication capabilities also carries a Quality of Life dimension through the Television Direct to Sailor (TV-DTS) initiative. An additional 20 ships received TV-DTS terminals in FY 01, increasing the number of ships receiving the TV-DTS broadcast from 112 to 132. TV-DTS itself increased its broadcast television channels from two to three. Sailors and Marines afloat now receive fulltime news, sports, and entertainment channels.

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Intelligence, Surveillance, Reconnaissance and Information Operations (ISR/IO)

In providing knowledge superiority for the warfighter, SPAWAR's ISR/IO systems give the Fleet essential capabilities for collecting, processing, and disseminating an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. SPAWAR supports this information mission primarily through its undersea warfare, signals exploitation and information warfare systems.

Undersea Warfare

SPAWAR continues to provide significant support in Undersea Warfare with its mobile, fixed, and rapid-deployable surveillance systems that make up the IUSS. The surveillance and cueing inherent to IUSS is a critical enabler in tactical anti-submarine warfare because of its ability to cover large areas while networking multiple sensor systems to produce usable contact information. IUSS accounts for 10 percent of critical objectives in the Navy's Strategic Planning Guidance.

Cumulative towed array operational capability was over 90% in FY 01. An extensive re-engineering program for this series has been initiated to increase overall array reliability.

To identify the capability upgrade priorities that will promote the rapid dissemination of data collected from IUSS sensors to warfighters, a comprehensive end-to-end C4I assessment was completed for all IUSS platforms. By leveraging the Horizontal Integration and Expeditionary Command, Control, Communications, Computers and Combat Systems Grid (EC5G) initiatives, procuring SPAWAR products, utilizing the Navy infrastructure of Teleport and the Navy/Marine Corps Intranet (NMCI), and adding Surveillance Towed array Sensor System (SURTASS) ships to the Information Technology for the 21st Century (IT-21) matrix, Fleet interoperability and ISR effectiveness will be enhanced while long-term C4I costs are being minimized.

The Advanced Deployable System (ADS) is a rapidly deployable, battery-powered, passive acoustic undersea surveillance system for littoral areas. It is modular and configurable for specific missions and can be covertly deployed. At-sea test events were successfully completed in April 2001.

Signals Exploitation and Information Warfare

In support of knowledge superiority, SPAWAR also provides the Fleet an IUSS-like capability for the RF environment. Its systems, known commonly as Tactical Cryptologic Systems (TCS), provide access to an adversary's geolocation, communications, and computer networks. TCS equipment locates emitters, cues other sensors, enables over-the-horizon targeting, support the exploitation of computer networks, and provides battle damage assessment. To provide this unique support to the battlegroup, TCS must have access to the growing set of low power, line of sight signals-of-interest in wireless computing and communicating networks. These advanced signals of interest are proliferating at an alarming rate as part infrastructure networks of foreign nations as well as of terrorist organizations. In partnership with NAVSEA and NAVAIR, SPAWAR continued its efforts in FY 01 to place TCS capabilities in both UAVs and in aircraft organic to the battlegroup.

SSEE Increment "E," scheduled to enter the Fleet in 2004, is the initial version of a Maritime Cryptologic System for the 21st Century (MCS-21). It will gradually replace existing surface ship signals intelligence, or SIGINT systems. MCS-21 is envisioned as a single, scalable, interoperable, evolutionary Information Warfare system that will eventually replace the numerous transportable SIGINT, Radio Direction Finding, Electronic Warfare, Computer Network Attack, and Computer Network Defend systems in use in our Fleet platforms.

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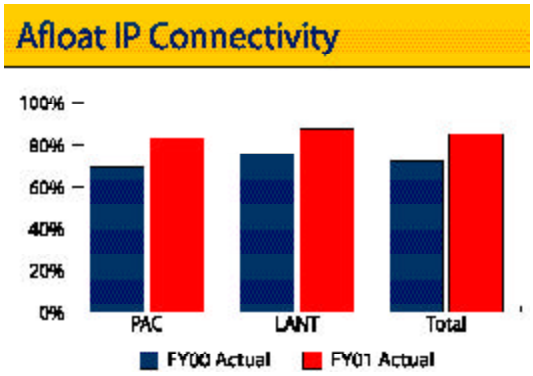
Afloat Connectivity

Approximately 60 percent of all Navy berths currently have an IP capability.

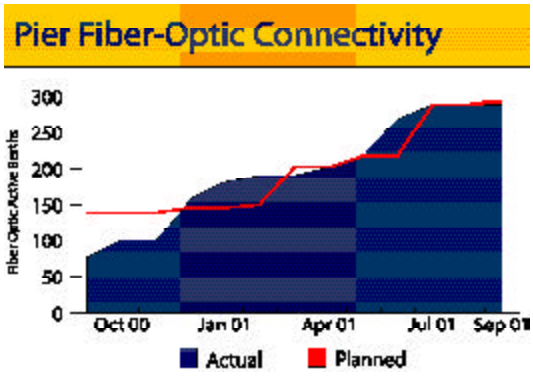
Shipboard IP Connectivity

Over the last few years, SPAWAR has worked aggressively to attain basic Internet Protocol (IP) connectivity across the Fleet. IP connectivity is provided by a reliable and scalable Local Area Network (LAN), a sufficiently large Radio Frequency (RF) "pipe", and a sufficient number of computers for going online and accessing web-based applications. As a result of SPAWAR's efforts in this area in FY 01, we reached an afloat IP connectivity of 82 percent for the Fleet.



Pier IP Connectivity

Approximately 60 percent of all Navy berths currently have an IP capability. In FY 01, SPAWAR provided fiber optic pier connectivity to over 200 berths located at bases in the United States. Pier connectivity under the Base Level Information Infrastructure (BLII) program was completed for 14 naval bases, both in and outside the United States. The chart below addresses our progress so far.



Information Security-Processing and Communicating Securely

In addition to the increasing ability to monitor an adversary's sensors, communications, and networks, it is also vital that we ensure that our own systems and communications paths are protected.

Information Assurance (IA)

As the Navy's leading agent for enhancing and transitioning IA capabilities, SPAWAR has specifically focused on the current readiness of its information security systems for the Fleet. In FY 01, SPAWAR increased its collaboration with its Navy, Joint/Coalition, and science and technology partners, yielding significant results in the design and testing of new IA product areas such as Electronic Key Management System and Public Key Infrastructure initiatives. Within the Department of the Navy, SPAWAR rendered significant security enhancements while integrating the security requirements and architecture for NMCI, BLII OCONUS, and IT-21 programs. Through active participation in Fleet Battle Experiments, SPAWAR has demonstrated important IA technologies such as biometrics, firewalls, and intrusion detection devices that proved to be highly successful, yielding significant data for future products.

SPAWAR also supports the Fleet's cryptographic and secure telephone equipment. In support of the Cryptographic Equipment Repair Program, SPAWAR conducted 3,966 equipment exchanges, 932 equipment screenings, 2,603 equipment repairs, and 480 technical assists in FY 01.

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Homeland Security and Force Protection Contributions

Following the terrorist attacks on 11 September, SPAWAR has placed additional emphasis to ensure delivery of the best capabilities possible for supporting any contingency response. Steps we have taken during the past year have positioned us to be responsive to accelerating and changing mission needs. The war on terrorism will, in many ways, be an information war, to which SPAWAR has contributed by its Homeland Security (HLS) efforts and the design of new force protection systems for our forces afloat. Now more than ever, knowledge superiority and integrated C4ISR products are essential to our success, both as a Nation, as well as a Service.

Contributions to Homeland Security

Pentagon Rebuild Efforts

In response to the attack on the Pentagon, SPAWAR provided significant contributions while restoring C4ISR capabilities within the Navy Command Center. On 12 September, SPAWAR had a team on-site at the Pentagon, assisting Navy staff in restoring essential Chief of Naval Operations (CNO) command center capabilities. With personnel from SSC Charleston and SSC San Diego, in addition to our Army counterparts, SPAWAR has been working persistently at restoring capabilities involving UHF SATCOM, GCCS, teleconferencing, and METOC. SPAWAR is presently working to establish command center capabilities in interim facilities by March 2002.

World Trade Center Efforts

In coordination with the Office of the Secretary of Defense and the Army-Marine Corps Unmanned Ground Vehicles/Systems Joint Project Office, SSC San Diego deployed three urban robots to New York City to assist in the search and recovery efforts at the World Trade Center. SSC San Diego personnel provided the technical coordination and operation of the robots. At the World Trade Center site, SSC San Diego personnel participated as part of a robotics team sponsored by the National Institute for Urban Search and Rescue in support of the Special Operations Branch of the Fire Department of New York.

Support for USNS Comfort

SPAWAR was also called upon to establish pier connectivity in New York City for *USNS Comfort*. SPAWAR's mission was to provide secure and nonsecure data and telecommunications and video teleconferencing capabilities to support the *Comfort's* casualty support mission. Teaming with Naval Computer and Telecommunications Area Master Station Atlantic, personnel from SSC Charleston were onboard, advancing the installation effort that same day. Advance coordination with AT&T and Verizon for telecommunications connectivity support (T-1 point-to-point Lease line) ensured that all technical elements were in place to support the *Comfort* when it arrived. Because of the efforts of SPAWAR personnel, service to the ship was established within 2 days and was maintained until *Comfort's* departure several weeks later.

Secure Voice Capabilities to the Fleet

SPAWAR provided over 1,600 secure telephones — more than seven times the normal monthly output — in support of HLS and the war on terrorism. More than 180 hours of technical assistance support calls were provided to the Fleet — more than three times the normal volume. Assistance was also provided through SPAWAR support of Secure Voice Bridge conference capabilities for NAVSEA, Navy Integrated Control Point, Coast Guard, and Marine Forces Reserve.

Improved Interoperability with the Coast Guard

SPAWAR improved communications interoperability between Navy and Coast Guard units in support of immediate HLS missions. This support included efforts to provide INMARSAT (support voice and IP communications to better integrate with Navy battlegroups), SATCOM capabilities, electronic systems readiness grooms, quick-response technical support, and communications interoperability with local law enforcement.

"Red Cell"

SPAWAR stood up a "Red Cell" to identify weaknesses in our C4ISR systems and to look for opportunities to rapidly insert advanced technologies. The Red Cell will exploit science and technology developments in government and industry to transition enhanced capabilities to SPAWAR's product line. We are working with the Naval War College on a series of HLS-focused war games to determine our vulnerabilities and identify potential corrective actions.

Afloat Force Protection Systems

As threats to our naval forces rise, the Navy continues to invest in its force protection systems. Working with both NAVSEA and NAVAIR, SPAWAR is providing a robust set of capabilities to prevent future *USS Cole*-type incidents, as well as to support HLS efforts for our shore installations.

Inshore Defense and Waterside Security

During FY 01, SPAWAR has worked persistently to improve the operational effectiveness and reliability of inshore force protection capabilities, including providing a capability to detect and track surface and subsurface targets in the vicinity of piers. Within 24 hours of the Fleet's request, SPAWAR delivered a new Mobile Inshore Undersea Warfare-System Upgrade (MIUW-SU) production unit which provides a significantly more mobile configuration, providing the Fleet with increased options and flexibility for deployment. In addition, various upgrades to the thermal and visual imaging sensors, including Electronic Support Measures, radar, and communications systems, were provided in FY 01 for the 17 MIUW-SUs already fielded.

Additionally, in FY 01, SPAWAR completed a coastal surveillance system at the navy's Fifth Fleet heaquarters in Bahrain. Now fully operational, the system markedly improves situational awareness of surface activity around Bahrain and enhances the force protection posture for our deployed operational units.

Force Protection Surveillance System

Following the attack on *USS Cole (DDG-67),* SSC Charleston helped design and deploy the Force Protection Surveillance System, a four-camera system providing 360-degree viewing coverage to assist a ship's overall force protection efforts. The system was initially deployed on *USS Constellation* in March 2001 and is scheduled to be deployed on all Pacific Fleet aircraft carriers in the next 2 years.

Base Security

SPAWAR is also developing systems to increase the security of our Nation's base facilities. In FY 01, SSC San Diego commenced installation of a facial recognition system and installation of an Under-Vehicle Inspection System, both being operationally tested and evaluated at the Submarine Base, San Diego. The Under-Vehicle Inspection System is an array of 9 high-resolution cameras with 12 high-output lamps enclosed in a grated housing. The system includes cabling, controls, and a 37-inch gas plasma flat-panel display. When a vehicle passes over the unit, a high-resolution image of the vehicle's undercarriage is displayed to the operator for assessment.

Following the attack on *USS Cole (DDG-67),* SSC Charleston helped design and deploy the Force Protection Surveillance System...

New Technologies Delivered

Knowledge Wall:

Developed by SPAWAR Systems Center (SSC) San Diego and fielded on Third Fleet flagship *USS Coronado (AGF-11)*, the Knowledge Wall is one of SPAWAR's more tangible representations of its "speed-to-capability" efforts. The Knowledge Wall is an innovative way for a command center to display multiple reconfigurable screens of information for any tactical or strategic situation. It is the first step in the innovative process of reconfiguring and displaying information in a Web-enabled environment. In addition to visualizing different operational environments, the warfighter also can collaborate with other units/commands using a virtual "whiteboard" tool, and can also access information from various

This extensive list of emerging technologies includes:

- Jini network computing,
- ultra-thin clients,
- littoral mobile wireless networking and communications,
- collaborative planning and data mining tools,
- information/data fusion and compression algorithms,
- multiband phased array antennas,
- buoyant antennas,
- acoustic communications,
- voice over IP,
- secure smart cards,
- high resolution plasma displays,
- speech/natural language processing (detection and extraction),
- 3D visualization,
- hyperspectral imaging for surveillance and targeting,
- command and decision walls and
- line-of-sight/beyond line-of-site networking.

During the past year, more than 100 emerging technologies were identified for their potential value as solutions to Fleet C4ISR challenges. Many of these technologies were found mature enough to undergo immediate testing in operational Fleet environments as candidate solutions to near-term NCW problems. Others are still being investigated, assessed and tracked for their potential to meet future NCW needs as well as the challenges of Joint Vision 2020.

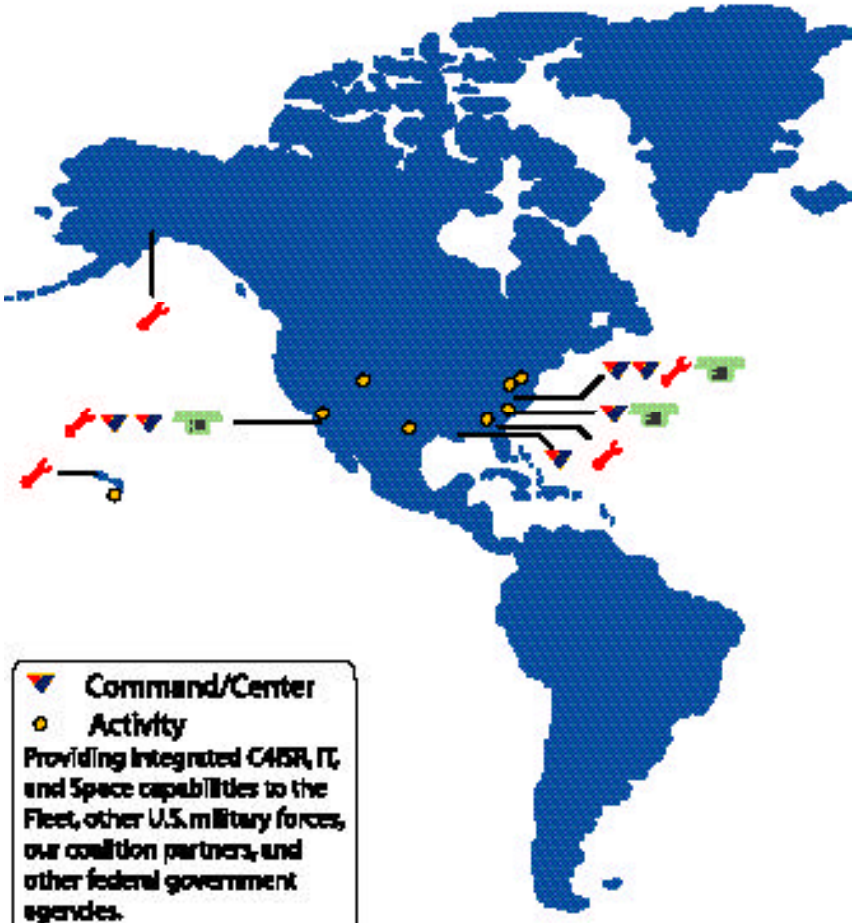
SPAWAR's investigations of technological solutions relate to problems affecting bandwidth, manning, distributed (afloat and ashore) command and control staff functions, remote network management, wireless line - of - sight communications, network architectures, decision support, interoperability with allies and coalition partners, topside antennas, and a multitude of other C4ISR shortfalls.

SPAWAR is working aggressively to reduce the nominal 18-month timeline for introduction of "fast track" technologies into the Fleet. Among the technologies on SPAWAR's fast track are ultra-thin clients, Jini network computing, remote network management and monitoring, secure smart cards, distributed collaborative planning and training tools, wireless LANs, and speech/language processing.

Introduction of GIGe Network:

In FY 01, SPAWAR began introducing Gigabit Ethernet (GIGe) technology to replace Asynchronous Transfer Mode (ATM) equipment among our naval networks. Migrating to GIGe technology will reduce system complexity and lower life cycle costs. It is easier to install, set up, administer and maintain; and is rapidly becoming the industry standard. Ships have yielded a 30 percent reduction in operator training time based upon initial installations completed in FY01.

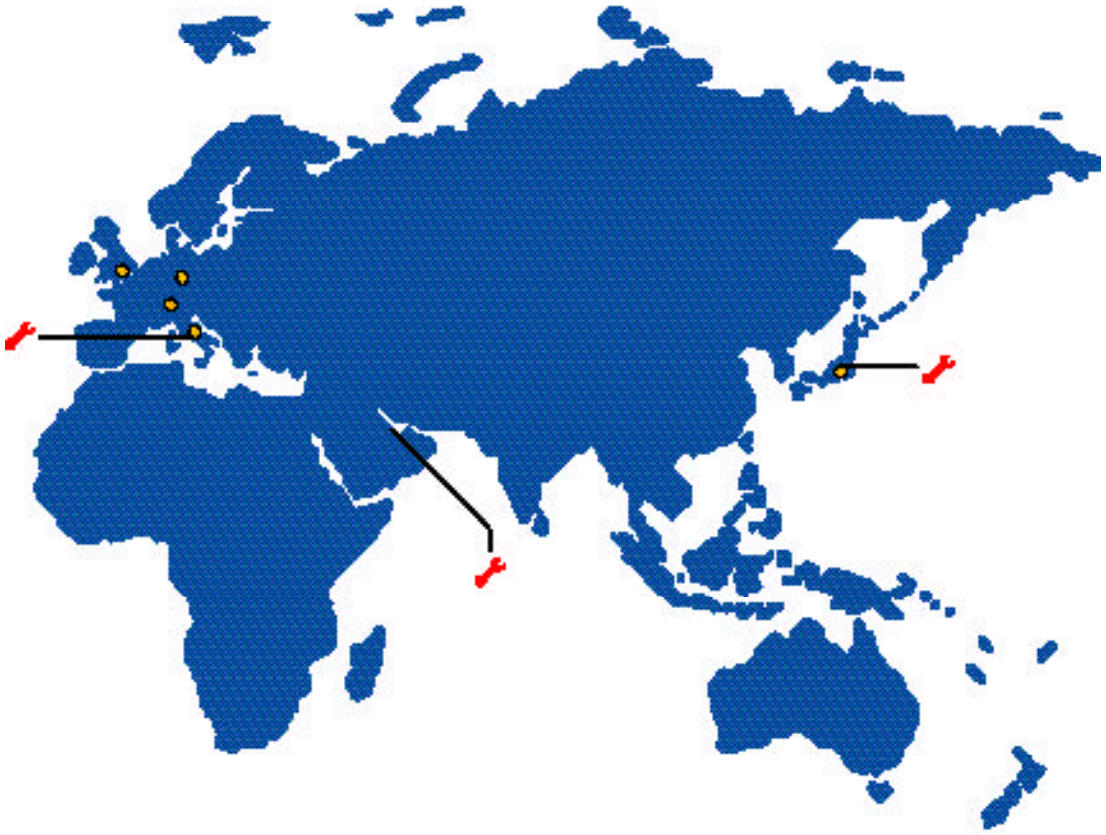
24/7 Support to the Fleet Worldwide



Command/Center
Activity

Providing integrated C4ISR, IT, and Space capabilities to the Fleet, other U.S. military forces, our coalition partners, and other federal government agencies.

HQ-	San Diego, CA
Centers-	Chesapeake, VA
	Charleston, SC
	New Orleans, LA
	San Diego, CA
Activities-	Worldwide



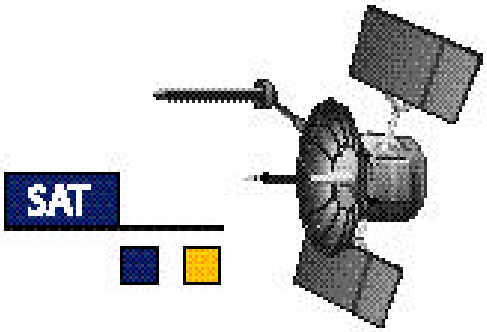
Help Desk

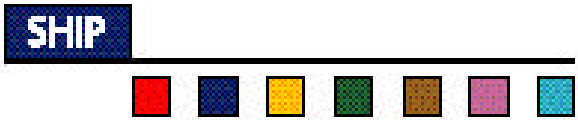
Providing remote technical and logistics support for C4ISR systems, access to answers for technical questions, solving logistics problems, resolving supply issues, and minimizing site visit requirements.

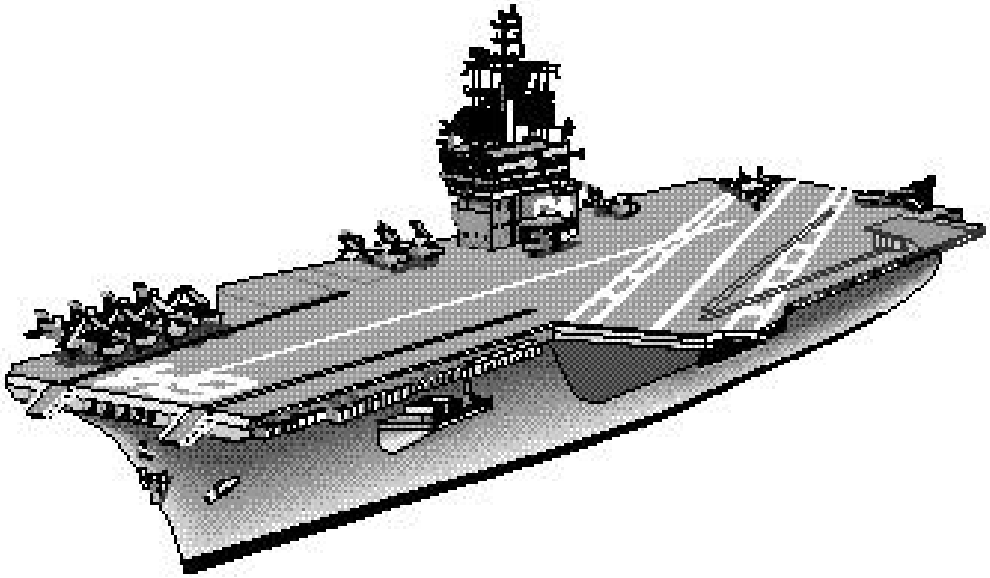
FSET

Providing technical expertise to support C4ISR systems D-20 through deployment to BG/ARGs and regional NOCs, as well as appropriate system training.

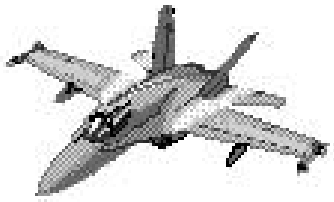
SPAWAR Services and Products





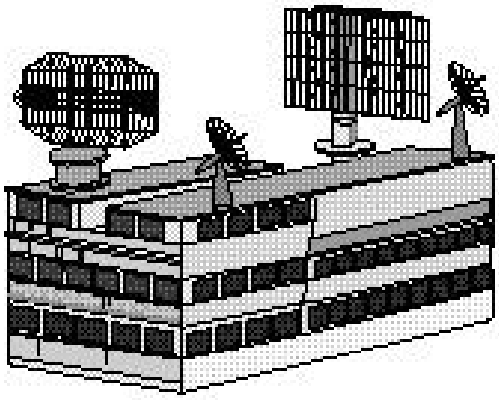


Services	Command, Control & Communications	Data Links	Space & SATCOM
Products	GCCS-M NTCSS CUBI SubHDR DMR NAVMACS2	CDL-N JTIDS TBMCS Integration Naval JSTARS Interface	CWSP MUOS INMARSAT GBS UFO



PLANE

SHORE



SUB

PCs/LAN	Information Security	ISR	Support Systems
DMS	EKMS	IUSS	NTCSS
NMCI	Navy PKI	SURTASS	VIPER
ISNS (GiGa & ATM)	Crypto Devices	ADS/FDS	JSORTS
JWICS	Network Security Systems (firewalls, VPN, IDS)	CDBLU	Smart Card
SCI ADNS		CDF	NALCOMIS
RF E-mail		SSEE	